

## Solid State Broadband High Power Amplifier

2184-001

1000 - 2000 MHz / 4000 Watts Peak

The (SKU 2184-001) is suitable for octave bandwidth high power pulse applications. This amplifier utilizes high power GaN devices that provide wide frequency response, high gain, high peak power capability, and low distortions. Exceptional performance, long-term reliability and high efficiency are achieved by employing advanced broadband RF matching networks and combining techniques, EMI/RFI filters, and all qualified components. The amplifier is constructed in 3RU+3RU+3RU multi-drawer rack chassis including the forced air-cooling. The system comes standard to operate at 220VAC, single phase AC supply.

The amplifier includes a built-in control and monitoring system, with protection functions which preserve high availability. Remote management and diagnostics are via an embedded web server allowing network managed site status and control simply by connecting the unit's Ethernet port to a LAN. Using a web browser and the unit's IP address (IPv4) allows ease of access with the benefit of multi-level security. The control system core runs an embedded OS (Linux), has a built-in non-volatile memory for event recording, and factory setup recovery features. The extended memory option allows storage of control parameters and event logs.



2184-001 (Also available in Rack Enclosure)

Empower RF's ISO9001:2008 Quality Assurance Program assures consistent performance and the highest reliability.

- Solid-state linear design
- Suitable for pulse (Consult factory for other modulation types)
- Compact Modular design
- 50 ohm input/output impedance
- Built-in Control, Monitoring and Protection functions
- High reliability and ruggedness
- Higher Power, Scalable Amplifiers Available (Call factory to learn more)

### ELECTRICAL SPECIFICATIONS over temperature conditions (-10 to +40°C)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency, Instantaneous bandwidth	BW	1000		2000	MHz
Power Output Peak	P <sub>PK</sub>	4000			Watt
Pulse Width @ Duty Cycle 6% Max.	P <sub>WIDTH</sub>	1.0		50	uS
Power Droop over 50uS pulse Width	P <sub>DROOP</sub>			0.5	dB
Pulse Rise and Fall Time (10% to 90%)	T <sub>R</sub> /T <sub>F</sub>			50	nS
Input Power for Rated P <sub>PK</sub> 4KW	P <sub>IN</sub>		0		dBm
Input Power Range	P <sub>IN</sub>	-5.0		+5.0	dBm
Power Gain @ Rated P <sub>SAT</sub>	G <sub>P</sub>	66			dB
Gain Adjustment Range	VVA	20			dB
Gain Flatness / Leveled ALC	ΔG			±2.5 / ±1.0	dB
Gain Stability/24HR	G <sub>STABILITY</sub>			±0.25	dB
Input Return Loss	S <sub>11</sub>			-10	dB
Output Return Loss	S <sub>22</sub>			-7.5	dB
NPO – Noise Power Output	Enabled			-10	dBm/MHz
	Disabled			-110	
Delay	Delay		400		nS
Spurious Signals	Spur			-60	dBc
Operating Voltage – (single-phase, 47-63Hz)	V <sub>AC</sub>	100		264	Volt
Power Consumption @ P <sub>OUT</sub> = 4000W <sub>PK</sub>	P <sub>D</sub>			800	Watt

### MECHANICAL SPECIFICATIONS

Parameter	Value	Units
Dimensions W x H x D (Excluding Brackets, Handles and Connectors)	17.5 x 15.75 x 22.0 (3RU + 3RU + 3RU)	Inch
Weight	250 (w/o rack cabinet.)	Pound
RF Connectors Input/Output (Rear Panel)	Input Type-N Female. Output Type-7/16 Female	-
Blanking Input	Type-BNC, Female	-
Cooling (front to rear)	Built-in, forced air cooling system	-

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### ENVIRONMENTAL CHARACTERISTICS:

Parameter	Symbol	Min	Typ	Max	Unit
Operating Ambient Temperature	T <sub>A</sub>	-10		+40	°C
Non-operating Temperature	T <sub>STG</sub>	-40		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude	Operating	ALT		10,000	Feet
	Non-operating			40,000	
Shock / Vibration - MIL-STD-810F Shock Method 516.5, Vibration Method 514.5		SH / VI		In Accordance With	

### PROTECTIONS:

Parameter	Specifications	Unit
Input Overdrive	+10 dBm	Max.
VSWR protection @ P <sub>OUT</sub> = 4000W <sub>PK</sub>	At 3:1 – PA backs-off peak output power to a safe operating level – no system shutdown, “On Air” time is maximized	-
Thermal – Graceful Degradation	Ambient +75°C, Automatic Recovery	Min.
Duty Cycle Limit	10%	Max.
Default Data Recovery	Factory Default Calibration Recovery	

### COMMUNICATION INTERFACES:

Function	Utility	Connector
Ethernet	Network management of device / web interface	RJ45
RS-232, RS-422 (optional)	Serial management of device / local operator access	D-Sub 9-position Male

### SYSTEM I/O CONNECTOR – 14-Position

Pin #	Description	Specifications
1	FWD Test Point	Forward detected power (analog voltage: 0-5 Volt)
2	REV Test Point	Reverse detected power (analog voltage: 0-5 Volt)
3	Summary Fault	Summary Fault: Active TTL Logic Low ( $\leq 0.7V$ ) (Internally Pulled-High)
4	VVA control (optional)	Gain control/Monitor: Analog Voltage Range 0-5V Gain Control: 0V= Max. Attenuator, 5V= Min. Attenuator
5	Shutdown	Amplifier Disable: TTL Logic Low ( $\leq 0.7V$ ) (Internally Pulled-High)
6	Aux P/S Test Point	+12.0V <sub>DC</sub> $\pm 2V$ (resettable 0.5amp fuse)
7	PSS Test Point	+44.0V <sub>DC</sub> $\pm 4.8V$ (resettable 0.5amp fuse)
8	GND	Ground
9	Open drain control	Site management utility (reserved)
10	Open drain control	Site management utility (reserved)
11	Open drain control	Site management utility (reserved)
12	Digital I/O (configurable)	Site management utility (reserved)
13	Digital I/O (configurable)	Site management utility (reserved)
14	GND	Ground

### Available Options

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#### Standard Features:

- LCD Control, Ethernet & Serial Comm.
- Type N Female Input & 7/16 (DIN) Female Output
- Rear SMA Sample Ports, Forward & Reverse Power
- BNC Female Blanking/Gating Port
- Rack Slides, Handles and Rackmount Bracket

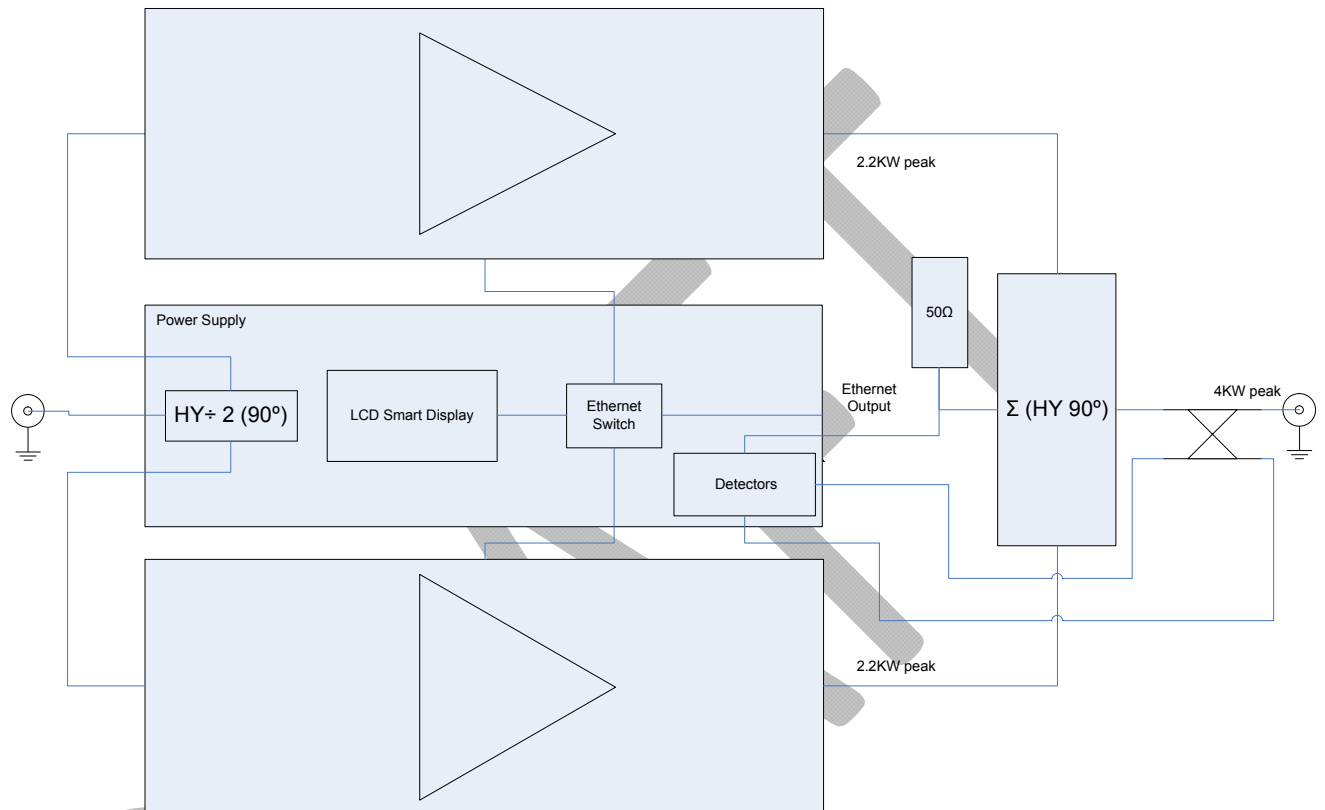
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### High Level System Block Diagram

### 4 KW – 1 to 2 GHz System Block Diagram



The Empower L Band 4KW, SSPA will consist of 2 x dual deck 3U amplifiers and one 3U Control/Power Supply, EIA 19" Standard chassis. The Control/Power Supply 3U chassis will host the 2 way 90°splitter and the Ethernet Switch. We could also build the Detectors inside the PS and the Smart Display.

The combiner and dual directional coupler are assembled directly to the rear of the units using blind mate connectors. The isolated load detector can steer the phase adjustment of one of the units to reduce the PA phase unbalance. The detectors are also located in the power supply and would be connected to the Smart Display by the I/O interface.

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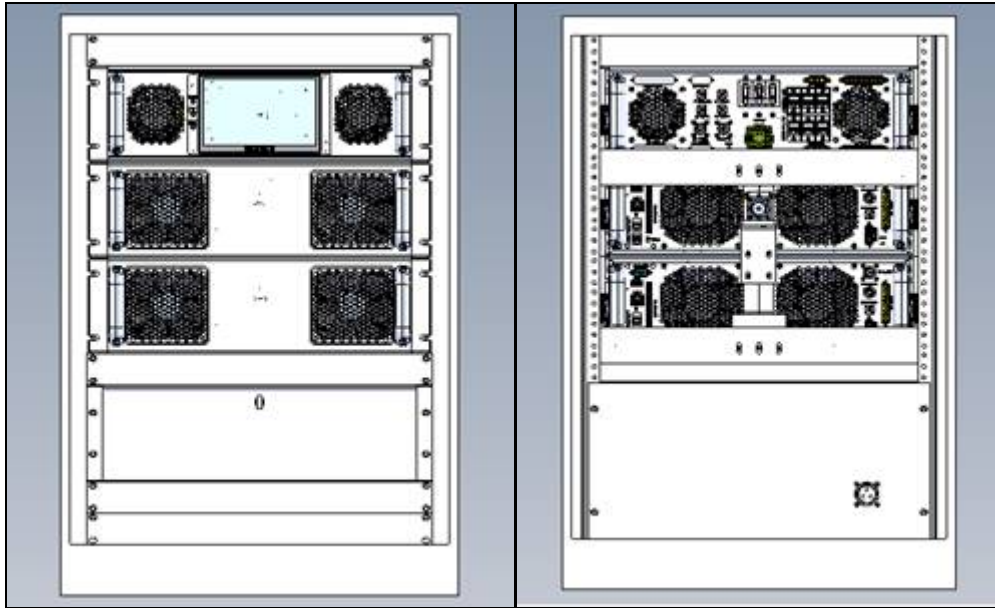
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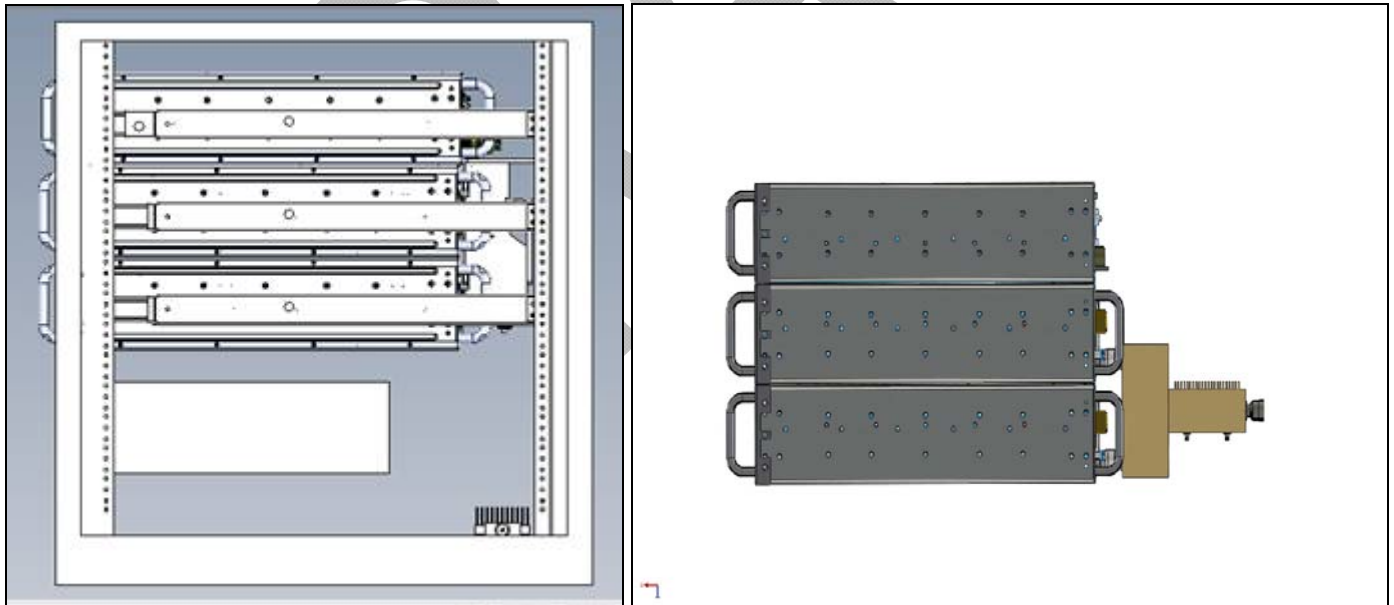
## (Optional) Cabinet - Mechanical Outline and Views

Front View

Rear View



Side View



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## Cabinet Enclosure Dimensions

